

§ 23.141

FLIGHT CHARACTERISTICS

§ 23.141 General.

The airplane must meet the requirements of §§ 23.143 through 23.253 at all practical loading conditions and operating altitudes for which certification has been requested, not exceeding the maximum operating altitude established under § 23.1527, and without requiring exceptional piloting skill, alertness, or strength.

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CONTROLLABILITY AND MANEUVERABILITY

§ 23.143 General.

(a) The airplane must be safely controllable and maneuverable during all flight phases including—

- (1) Takeoff;
- (2) Climb;
- (3) Level flight;
- (4) Descent;
- (5) Go-around; and
- (6) Landing (power on and power off) with the wing flaps extended and retracted.

(b) It must be possible to make a smooth transition from one flight condition to another (including turns and slips) without danger of exceeding the limit load factor, under any probable operating condition (including, for multiengine airplanes, those conditions normally encountered in the sudden failure of any engine).

(c) If marginal conditions exist with regard to required pilot strength, the control forces necessary must be determined by quantitative tests. In no case may the control forces under the conditions specified in paragraphs (a) and (b) of this section exceed those prescribed in the following table:

Values in pounds force applied to the relevant control	Pitch	Roll	Yaw
(a) For temporary application:			
Stick	60	30
Wheel (Two hands on rim)	75	50
Wheel (One hand on rim)	50	25
Rudder Pedal	150
(b) For prolonged application	10	5	20

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§ 23.145 Longitudinal control.

(a) With the airplane as nearly as possible in trim at $1.3 V_{S1}$, it must be possible, at speeds below the trim speed, to pitch the nose downward so that the rate of increase in airspeed allows prompt acceleration to the trim speed with—

- (1) Maximum continuous power on each engine;
- (2) Power off; and
- (3) Wing flap and landing gear—
 - (i) retracted, and
 - (ii) extended.

(b) Unless otherwise required, it must be possible to carry out the following maneuvers without requiring the application of single-handed control forces exceeding those specified in § 23.143(c). The trimming controls must not be adjusted during the maneuvers:

(1) With the landing gear extended, the flaps retracted, and the airplanes as nearly as possible in trim at $1.4 V_{S1}$, extend the flaps as rapidly as possible and allow the airspeed to transition from $1.4 V_{S1}$ to $1.4 V_{SO}$:

- (i) With power off; and
- (ii) With the power necessary to maintain level flight in the initial condition.

(2) With landing gear and flaps extended, power off, and the airplane as nearly as possible in trim at $1.3 V_{SO}$: quickly apply takeoff power and retract the flaps as rapidly as possible to the recommended go around setting and allow the airspeed to transition from $1.3 V_{SO}$ to $1.3 V_{S1}$. Retract the gear when a positive rate of climb is established.

(3) With landing gear and flaps extended, in level flight, power necessary to attain level flight at $1.1 V_{SO}$, and the airplane as nearly as possible in trim, it must be possible to maintain approximately level flight while retracting the flaps as rapidly as possible with simultaneous application of not more than maximum continuous power. If gated flat positions are provided, the flap retraction may be demonstrated in stages with power and trim reset for